

EDUCATIONAL ENVIRONMENTS AND WEB MINING

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Abstract

At the present time, education environments have two types. These are traditional and virtual education environments. In both the area, one of the important problems is habit analysis and evaluation. In traditional education systems, habit analysis is done easily through observation techniques, whereas in virtual ones analyzing students' attitudes and habits is a significant problem. Web mining applications, used in providing meaningful information from meaningless habits and surfing in web environments, is the way to overcome this problem. In this study, web mining applications in virtual education environments were formed in accordance with descriptive research method. In conclusion, how web mining is used in education environments was discovered.

Keywords: *web mining; education; distance education; virtual; Attitude, VLE, LMS, CMS, LCM.*

1. Introduction

Virtual education is in an attempt to create an alternative to traditional education environments. Virtual education environments show a rapid development together with the developments in the internet technologies. While virtual education environments proceeded in a one way structure during 1990s, it is seen that virtual education environments have presented bidirectional interaction and completely three dimensional study environments by 2000s. It is also seen that virtual education environments are in an attempt to create an alternative to traditional class environments by virtual libraries, virtual quizzes, guidance services, smart content systems and education management systems. However, it is seen that among all these elements, the greatest lack is the knowledge with no meaning.

Virtual education can be considered as of three categories consisted of educational activities in university level for now.

These are:

1. Academicals degree programs

- a. Undergraduate programs
 - b. Graduate, Post graduate and Doctorate programs
2. In-service education programs for occupation purposes.
 3. Special programs for social purposes [4]

Together with the developments of internet technologies, more online communication and education environments have begun to be used. The conveniences brought particularly by the new technologies presented freely and the tools of web 2.0 which could be considered as an internet revolution have begun to be used and as parallel to this, the concept of Learning 2.0 has emerged [5]. Virtual education environments produced for educational purposes are commonly in different system cases of Virtual Learning Environments (VLE), Learning Management Systems (LMS), Course Management Systems (CMS) and Learning Content Management Systems (LCM) [3]. These systems are indicated as follows.

1.1 Virtual learning systems

These are the software used as online learning environments. Together with VLE software, there are content download, update, the opportunity to send the studies of the students, sections of questions and answers, the opportunity to form student groups and student proceeding tools. Blog, Wiki and 3D learning environments can be integrated to VLE applications. Although these systems are generally designed to be used for the distance education, they are also used as the tools supportive of face-to-face education today. Some Virtual learning applications are as follows:

- Blackboard
- Moodle (Also works for Content Management System)
- WebCT - software applications designed to enhance teaching and learning
- FirstClass - messaging and communications solution
- Desire2Learn - Desire2Learn eLearning solutions
- CyberExtension - Virtual Managed Learning Environment
- WebTrain - Virtual live classes

1.2. Learning management system (LMS)

Softwares are web programs giving opportunities like content management, user access control, document organization, user behavior proceeding, virtual classes, e-learning programs, applications and interactions between the users [2], according to Ellis, an LMS system shall have the following features:

While both VLE and LMS applications which are the web 2.0 tools used today serve in a way to aim more user satisfaction, it is planned that web 3.0 technology, which shall display activity in the future shall present a meaningful web structure aimed more at private. As well as web 3.0 presents a structure aimed at private, it also forms a significant platform in forming a social network and in online communication area. The roof of this platform is provided with semantic web applications. The softwares to be used for online communication and education are named as Social software.

These services presented have possibility to be used in various lesson environments like LMS and CMS. Meaningful results could be gained particularly through web pages to be developed in

accordance with Social learning and social development models and the efficient mixture of these online services [8]. While web 2.0 represents today's semantical web applications, semantical web applications are planned to be more meaningful with web 3.0. However, semantical web 2.0 or web 3.0 applications will not be efficient unless some features related to environmental regulations are accomplished.

While using the virtual education environments, there shall be features in demand. These features; the basic features of an e-learning environment: attach importance to the necessities of the individual, design the education activities as learner-centered, provide learning experiences not limited with time and place, form an interaction with at least double directions, work collectively, learn by cooperation, share opinions, ideas and feelings, respect, develop the critical thinking skills, gain experiences based on project, gain the experiences related to real life, have education lifelong, get knowledge from the first source and give information, get the knowledge that is regularly and constantly updated and give information, present democratic and participant education opportunities, take the responsibility of learning and share the results, the constant knowledge-based education and give information to the participants[7]. If one notices all these features, an effective virtual learning environment shall be accomplished.

One of the best developed virtual education environment that is represented today is web mining. The term web mining aims to explore the web connection structures in the internet environment which was first used by Etzioni, the contents of the pages and the meaningful knowledge in the direction of access data of the user [1]. Additionally, the information pollution rising in web environments and meaningless information trashes formed the necessity of web mining together with the necessity of revealing a more regular and meaningful information. One of the first application forms of web mining is web 2.0.

2. Web 2.0

With the start of Web 2.0 in the internet, the sites based more on the interactions between the users have begun to arise. With web 2.0, the explosion especially on social networks attracts the

attention. A great amount of new applications that can easily be accessed by the user have been opened to service and new applications have been utilized to be formed by mixing several new applications without knowing a programming or html codes [9]. Recently web 2.0 tools have begun to be used more in the distance education environments. Some of the significant tools presented within the frame of Web 2.0 are as follows:

2.1. Wiki: It is the web page structure with a content which can be changed easily by the user. Wiki uses the hypertext architecture as system; however the users who add information to the page do not have to be familiar with a HTML code. Wiki gives opportunity to add content easily by means of a standard text editor presented to the user. Another significant feature of Wiki is that it depicts the changes of the content based on date. Wiki can develop content in the web pages using the system with collaborative approach. There are more than 9 million web pages in Wikipedia which is the greatest sample of Wiki and the content of the pages are constantly being developed by the users.

2.2. Blog: Blog is the structure of web page where users can make their own pages and regulate the content easily. Blog pages are generally consisted of a structure with two columns. On one side is the flow of the newly-added content and on the other side, categories and the related subjects are displayed. Blog pages give the visitors the opportunity to follow with RSS feed.

2.3. Micro Blog: Micro blog services give the opportunity to follow the activities of a person or an establishment. Twitter, which is the most commonly used representator of Micro blog services gives the user the opportunity to send current messages through typing with 140 letters. The greatest feature of the micro blogs is that the people with common interests can follow various activities and the announcements spread rapidly. The new generation REST applications and various applications in the web pages can send messages to micro blog services.

2.4. Social Bookmark Services: This service gives the opportunity to save the list of favorites which is hidden with a browser in the computer in a social web site. The greatest advantage it provides is that the people with interests can share links.

Moreover, the links with a risk to get lost in the computer are permanently hidden by this way.

2.5. Social Networks: They are the great internet pages where users interact extensively. The majority of the content is constituted by the users who visit the page. The users with common interests on social networks may form groups and they may also make various activities. With the help of API architecture used in social networks, everyone can develop an application.

2.6 Video and File Sharing: These are the environments where users can add videos, presentations and various files and share them with other users. YouTube, Rapidshare and Slideshare could be depicted as the greatest samples of those. The content of these sites are completely formed by the users. The categories of the sites are extended by the “Tag” system added by the users. The users upload the files, determine the categories on their own and they arise the interaction by making comments. The common feature of the file sharing systems is that they give opportunity to display the file of the users on the internet page without noticing the type of the file and to share them in various environments by using the EMBED codes. For example, a video file uploaded to YouTube site may be AVI or MOV, it is converted to FLV file by the system and is displayed by Flash application which is standard available on every browser. Similarly, the PowerPoint presentations uploaded to slideshare site are displayed on the internet page without an additional application.

It is seen that every kind of web 2.0 tools indicated above has an important place in forming virtual education environment and they are all dynamic elements in virtual education environments. However, the question of how meaningless information in virtual education environments would be converted into meaningful is still a lacking side in spite of all these. The best example for this is the web mining components used in semantic web applications.

3. Web Mining

Web mining has an environment of utilization on every unit of the internet world. With the concept of web mining, human behavior analysis is analyzed from E-trade applications to E-learning applications. Web mining is the general name of

the data mining technique used in an attempt to make content analysis from the online web sites. Web mining has the facility of utilization in two different areas, the first is the analysis related to the content of the pages presented and the second is the analysis based on the user interaction.

The user interaction could be specified as; messages, behaviors related to the content and the behaviors depicted by the user while she or he visits the pages. Analyzing these behaviors, the person can get some information about the learners; her or his behaviors against the content, her or his transition among the lessons, how she or he is effected by the structure of the web site, the

duration of analyzing the lessons and how she or he proceeds in the web page can be determined [10,11].

In study made in [1] suggested a new process related to cleaning the text-based web user access registers. The application of the suggested process and the program coding have developed in JAVA based SAS base software environment. Meaningful and interesting information has been evoked by processes based on web mining techniques from text-based user access register files which are complex, irregular and meaningless. The application of web mining as follows.

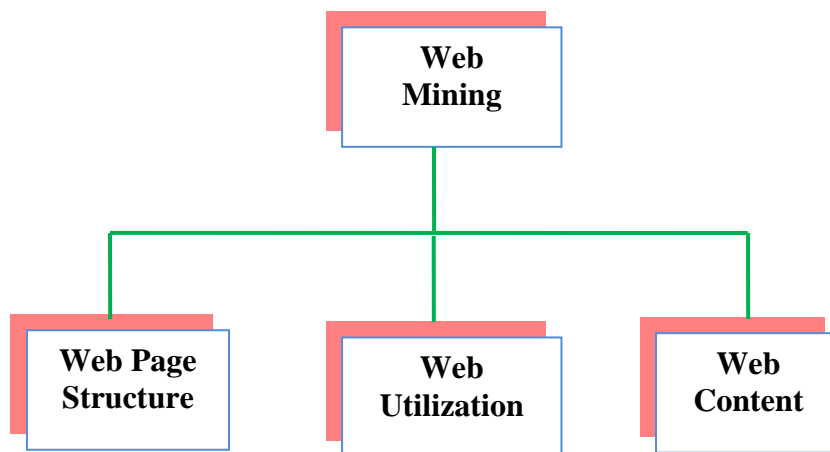


Figure 1. The Classification of Web Mining

Web mining can be classified under three topics:

Web Page Structure mining: As a result of this data mining which makes analysis in accordance with interpage connection and the content categories, the pages could be lined up according to the order of importance. By this way, the search results could be lined up in accordance with the state of importance of the pages.

Web utilization mining: It tries to find meaningful results by examining the content formed as a result of the interactions of the users in web pages. Web logs, click rates, reference sites and search words can be included in this analysis. The data gained from these resources shall primarily be cleaned of the parasites. The data gained from web utilization mining can produce web page structures with a conveniently differentiating state.

Web content mining: In this data mining technique, which uses the web pages as information sources, HTML pages, XML sources and Database sources related to content –if

necessary- (WebLog or WebSQL) can generally be used? The pages constituting the content can be classified with various groups [6].

4. Conclusion and Discussion

Web mining is considered as the most efficient net tool in converting the meaningless information into meaningful in the internet environment, processing the data, extracting the data and making route map by the data acquired. Web mining shall have a greater significance with the increase of the applications on the internet. Web mining utilization shall increase especially with the utilization of more meaningful web pages with web 3.0. Examining the behaviors of the students on web pages and the fact that smart education systems of the future are in a way to react to the behaviors of the users are dependent on web 3.0 and web mining applications.

According to the study, the following features can be found in the smart learning systems which

would help with the behavior of the students on web pages:

- Presenting the convenient content in accordance with the learning type of the user.
- Altering the content of the learning in accordance with the interests of the user.
- Presenting the smart structure that presents a content to rise the motivation in case the student is determined to be bored of the lessons.
- Presenting a detailed and different content after determining the subject which is not fully comprehended by the student in case the student does not get efficient marks from the end of section quizzes.
- Altering the subjects as slower or faster by determining the learning speed.
- Presenting the content special to person in other lessons by determining and recording the features of the students.

The smart web pages to be emerged in the virtual learning environments which are considered to be more active in the future are only possible with the development of the structures that use web mining efficiently because of the need of determining the student behaviors in utilization of the distance learning systems. A more meaningful and a more personalized web environment could be presented only by this way.

The meaningful information from meaningless data registers and the analysis of the behaviors recognized on the behaviour analysis of the educational environments, student evaluation files, interpage visits on exams or virtual environment has been observed. The web mining applications are determined to be the most significant tool to be used in every kind of fields, from evaluation dimension for virtual education environment to content management systems and to education management systems.

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